

## ABSTRACT

There is disclosed a photo detect device using quantum dots, which can detect incident light effectively and be operated at room temperature without additional equipment or treatments. The photo detect device, in which the transfer and channels of carriers are set in the horizontal direction by heterointerfaces insulator/semiconductor interface and/or impurity doping and the magnitude of the currents which flow through the channels is determined by the control of Fermi level, can be materialized by a method comprising the steps of: forming quantum dot layers at predetermined positions near the channels in such a manner that the carriers should be released from the quantum dot layers in response to the detection of light and accumulated in the channels; and providing the Fermi level at an activation position by confining the carriers within the quantum dot layers while limiting the number of the carriers in the channels for the purpose of minimizing a current flow in the absence of incident light.